

REMARKS/ARGUMENTS:

Minor changes are made to this specification. Claim 5 is canceled without prejudice. Claims 1-4 and 6-14 are amended. Support for the amendment to claim 1 can be found in original claim 5. Claims 1-4 and 6-14 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

The present invention is directed to a pressure sensor device for detecting gas or liquid pressure fluctuations and oscillating an electric signal, the pressure sensor device being used, for example, to monitor the air pressure of a tire. (Applicant's specification, at p. 1, lines 5-9).

SPECIFICATION:

The title of the invention is objected to because the Office contends that the title of the invention is not descriptive. The Office is requiring a new title that is clearly indicative of the invention to which the claims are directed. Applicant respectfully disagrees that the title is not descriptive. However, Applicant has re-written the title in order to avoid delays in prosecution of the instant application. Specifically, the new title is as follows: PRESSURE SENSOR DEVICE WITH SURFACE ACOUSTIC WAVE ELEMENTS. Withdrawal of the objection is respectfully requested.

CLAIM OBJECTIONS:

Claim 11 stands objected to because there is a lack of antecedent basis for "the oscillating circuit" in line 4. In response, Applicant changed "the oscillating circuit" to --an oscillating circuit--. Withdrawal of this objection is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 102:

Claims 1-4 and 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Schmidt et al. (U.S. Patent No. 4,295,102). Applicant respectfully traverses this rejection as to amended claim 1. Claim 1, as amended, includes the limitations of canceled claim 5. Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schmidt in view of Kishimoto et al. (U.S. Patent No. 6,420,818).

Claim 1, as amended, is as follows:

A pressure sensor device with surface acoustic wave elements comprising:

a first piezoelectric substrate having a surface acoustic wave element for reference formed on an upper surface thereof;

a second piezoelectric substrate that is thinner in thickness than the first piezoelectric substrate and having a surface acoustic wave element for pressure detection formed on a lower surface thereof; and

a sealing member to be joined to the upper surface of the first piezoelectric substrate and to the lower surface of the second piezoelectric substrate so as to form a space enclosed by the sealing member between the first piezoelectric substrate and the second piezoelectric substrate,

wherein the sealing member is made of a conductive material and is electrically connected to a ground terminal provided on the first piezoelectric substrate.

Applicant respectfully submits that the cited references cannot anticipate or render claim 1 obvious, because the combination of references fails to teach or suggest "a sealing member to be joined to the upper surface of the first piezoelectric

substrate and to the lower surface of the second piezoelectric substrate so as to form a space enclosed by the sealing member between the first piezoelectric substrate and the second piezoelectric substrate, wherein the sealing member is made of a conductive material and is electrically connected to a ground terminal provided on the first piezoelectric substrate.”

The Office cites Schmidt for teaching the claimed invention except for wherein the sealing member is made of a conductive material and is electrically connected to a ground terminal provided on the first piezoelectric substrate. The Office cites Kishimoto for teaching a pressure transducer having a sealing member being an electrically conductive adhesive. Kishimoto's electrically conductive adhesive adheres the piezoelectric plate 2 to the metal plate 3 (Kishimoto, column 4, lines 12-17). Between the piezoelectric plate 2 and the metal plate 3, no space is formed (see e.g., Kishimoto, Figure 6).

In contrast, in the present invention, the sealing member is joined to the upper surface of the first piezoelectric substrate and to the lower surface of the second piezoelectric substrate and forms a space enclosed by the sealing member between the first piezoelectric substrate and the second piezoelectric substrate. The term “space” is understood to exclude a case where the two plates are tightly adhered to one another. Kishimoto does not utilize a “space” because the piezoelectric plate 2 and the metal plate 3, together, form a diaphragm 1. However, in the present invention, the first and the second piezoelectric substrates vibrate distinctly. Therefore, it is necessary to have a space is between the piezoelectric substrates.

In light of the foregoing, Applicant respectfully submits that the cited references could not have anticipated or rendered claim 1 obvious, because the combination of references fails to teach or suggest each and every claim limitation.

Claims 2-4 depend from claim 1 and cannot be anticipated or rendered obvious for at least the same reasons as claim 1. Withdrawal of this rejection is thus respectfully requested.

Claim 6, rewritten as an independent claim, is as follows:

The pressure sensor device with surface acoustic wave elements comprising:

a first piezoelectric substrate having a surface acoustic wave element for reference formed on an upper surface thereof;

a second piezoelectric substrate that is thinner in thickness than the first piezoelectric substrate and having a surface acoustic wave element for pressure detection formed on a lower surface thereof;

a sealing member to be joined to the upper surface of the first piezoelectric substrate and to the lower surface of the second piezoelectric substrate so as to form a space enclosed by the sealing member between the first piezoelectric substrate and the second piezoelectric substrate;

an electrode pad electrically connected to the surface acoustic wave element for pressure detection, the electrode pad being provided on the lower surface of the second piezoelectric substrate within the space enclosed by the sealing member; and

a connection pad electrically connected to the electrode pad via a conductive bonding material, the connection pad being provided on the upper surface of the first piezoelectric substrate inside the sealing member.

Applicant respectfully submits that Schmidt cannot anticipate or render claim 6 obvious, because Schmidt fails to teach or suggest "an electrode pad

electrically connected to the surface acoustic wave element for pressure detection, the electrode pad being provided on the lower surface of the second piezoelectric substrate within the space enclosed by the sealing member; and a connection pad electrically connected to the electrode pad via a conductive bonding material, the connection pad being provided on the upper surface of the first piezoelectric substrate inside the sealing member.”

The present invention requires an electrode pad provided on the lower surface of the second piezoelectric substrate within the space enclosed by the sealing member, and a connection pad provided on the upper surface of the first piezoelectric substrate inside the sealing material. The term “pad” as used in the present invention is not equivalent to an elongated “electrical lead 8” as described in Schmidt (Schmidt, column 2, lines 32-40; Figures 2-4). The pad of the present invention corresponds to “contacts 9” in Schmidt.

The Office at, p. 4, lines 2-5, states that Schmidt teaches “a connection pad electrically connected to the electrode pad via a conductive bonding material (The connection pad must be connected by a conductive material such as a silver solder due to the pads direct connection to electrically conductive leads (8)).” Applicant respectfully disagrees that such a connection pad or bonding material is taught or suggested by Schmidt. In the present invention, the pad is disposed in the space enclosed by the sealing member, while Schmidt’s “contacts 9” are not disposed in the space enclosed by the sealing member (glass frit 12). In the present invention, the pads are connected to each other electrically with a conductive bonding material.

In light of the foregoing, Applicant respectfully submits that Schmidt could not have anticipated or rendered claim 6 obvious, because Schmidt fails to teach or

suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schmidt in view of Kishimoto et al. (U.S. Patent No. 6,420,818). This rejection is moot with respect to claim 5 due to the cancellation of this claim.

Claims 11-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schmidt in view of Miyazaki et al. (U.S. Patent No. 6,998,926). Applicant respectfully traverses this rejection.

Claims 11-14 depend from claim 1, and are therefore, patentable over Schmidt and Kishimoto for the reasons discussed above. Miyazaki cannot remedy the defect of Schmidt and Kishimoto and is not relied upon by the Office for such. Instead, the Office cites Miyazaki for teaching an antenna pattern formed on the piezoelectric sensor.

In light of the foregoing, Applicant respectfully submits that the cited references could not have rendered claims 11-14 obvious, because the combination of references fails to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

ALLOWABLE SUBJECT MATTER:

The Office states, "Claims 7-10 are objected to as being dependent upon a rejected base claim, but would allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." In response, the Applicant rewrote claims 7-10 in the manner suggested by the Office. Withdrawal of this objection and allowance of claims 7-10 is thus respectfully requested.

Appl. No. 10/580,899
Amdt. Dated September 24, 2007
Reply to Office Action of June 29, 2007

Attorney Docket No. 81872.0116
Customer No.: 26021

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 785-4600 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

Date: September 24, 2007

By: 

Lawrence J. McClure
Registration No. 44,228
Attorney for Applicant(s)

1999 Avenue of the Stars, Suite 1400
Los Angeles, California 90067
Phone: 310.785.4600
Fax: 310.785.4601